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ABSTRACT

The authors present an approach to the assessment of learning disabilities based on a definition of significant enabling skills for school learning. Students' competence in information processing, language, and mathematics is assessed in 11 tests. By using the Assessment of Basic Competencies test, it is possible to determine a child's location in each of 11 developmental sequences, as well as to identify strengths and weaknesses in clusters of skills. Assessment results provide data for designing the individualized educational program. (Author)

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I. Adequacy of Norm-Referenced Data for Prediction of Success

II. Computer Simulation Research on the Assessment/Decision-making/Intervention Process

III. Comparative Research on Children Labeled LD and Children Failing Academically but not Labeled LD

IV. Surveys on In-the-Field Assessment, Decision Making, and Intervention

V. Ethological Research on Placement Team Decision Making

VI. Bias Following Assessment

VII. Reliability and Validity of Formative Evaluation Procedures

VIII. Data-Utilization Systems in Instructional Programming

Additional information on these research areas may be obtained by writing to the Editor at the Institute.

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Monograph No. 9

A NEW APPROACH TO THE ASSESSMENT OF LEARNING DISABILITIES

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Abstract

Public Law 94-142 states that a team may determine whether a child has specific learning disabilities, but does not provide a conceptual definition for learning disabilities. In the absence of such definition, several operational procedures have been adopted, and frequently, diagnosticians look for discrepancies between intelligence and achievement in specific areas. A new approach to the assessment of learning disabilities, based on a definition of significant enabling skills for school learning, is presented. Children's competence in information processing, language, and mathematics is assessed in 11 tests. By using the Assessment of Basic Competencies test, it is possible to determine a child's location in each of 11 developmental sequences, as well as to identify strengths and weaknesses in clusters of skills. The assessment results from the test provide data for the design of individualized educational programs.

A New Approach to the Assessment of Learning Disabilities

Amidst great expectations for the good of learning disabled children, the Federal Register of December 29, 1977 announced the provisions of Public Law 94-142. The "cap," or limit of two percent, was removed, and there was no eligibility formula. The process of identification was to be carried out as follows:

> a team may determine that a child has a specific learning disability if the child does not achieve [in any one of seven listed areas of skill] commensurate with his or her age and ability levels. (p. 65083)

After identification, the responsibility is shifted to the teacher, who must prepare and implement an individualized educational program (IEP). If parents are dissatisfied with what happens to the child, they have recourse to "due process." While avoiding a clean solution, the law retained all the uncertainties regarding the concept of disorders in basic psychological processes, and the rationale for the inclusion and non-inclusion of certain conventional categories of handicapped children. But despite these uncertainties, the mandate was clear: a group of individuals was to identify children with specific learning disabilities, and a teacher was to prepare and implement an IEP. These professionals now are in great need of help, as there exists no clean frame of reference within which to carry out assessment, few, if any, adequate instruments for carrying out diagnosis, and no logical basis for translating the results of current assessment procedures into effective teacher behaviors.

This paper presents a new approach to the assessment of learning

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disabilities. This approach is based on a clear listing and definition of what are considered to be significant enabling skills for school learning as a basis for determining what skills children have or do not have. These skills are grouped into three domains: information processing, language, and mathematics. Eleven different scales have been developed and normed within the framework of these three broad domains. By using the procedures developed, it is possible to determine a child's location in each of the 11 developmental sequences, and to determine what lags exist in his or her acquisition of basic competencies. This approach is different from the comparative approach, in which disability is determined as a discrepancy between achievement and intellectual ability, or from the classification approach, in which tests and other procedures are used to determine placement of children in conventional categories of disability. In essence, regardless of etiology, with the new approach a child is assessed against scaled developmental criteria for the purpose of designing individualized educational programs.

Current Approaches to the Assessment of Learning Disability

The term "learning disability" became popular in the 1960's. Kirk (1962) made a case for learning disability as a developmental lag in one or more psycho-linguistic processes. In 1968, the National Advisory Committee on Handicapped Children (USOE, 1968) gave a definition which has been the most influential in determining the nature of the assessment for learning disability. This definition stated:

> Children with special learning disabilities exhibit a disorder in one or more of the basic psychological processes involved in understanding or in using spoken or written language. These may be manifested in

> disorders of listening, thinking, talking, reading, writing, spelling, or arithmetic. They include conditions which have been referred to as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia, etc. They do not include learning problems which are due primarily to visual, hearing, or motor handicaps, to mental retardation, emotional disturbance, or to environmental disadvantage.

The definition refers to disorders in basic psychological processes, but does not identify or define these processes. Further, the definition makes no statement about intelligence, or ability, an element which has clouded application at the field level. In time, a discrepancy between ability and achievement became central to the definition of learning disability. Such imprecise definitions led to a broad range of practices in the determination of learning disability, and left State Departments and school systems to adopt their own definitions and procedures. An overview of definitions of learning disabilities used in the U.S. is given by Mercer, Forgnone, and Wolking (1976).

The Federal Register of November 29, 1976 contained proposed procedures for determining the existence of specific learning disabilities in conformity with Public Law 94-142. Learning disability was defined as:

> severe discrepancy between achievement and intellectual ability in one or more of several areas: oral expression, written expression, listening comprehension or reading comprehension, basic reading skills, mathematics calculation, mathematics reasoning, or spelling. A "severe discrepancy" is defined to exist when achievement in one or more of the areas falls at or below 50 percent of the child's expected achievement level, when age and previous educational experiences are taken into consideration. (Federal Register, 1976, p. 52405)

The objections raised by the educational community to this statistical

approach are well documented.

The most recent announcement of procedures to be used for determining learning disability, which appeared in the Federal Register of December 29, 1977, did not resolve the problem. Rather than stating what constitutes a learning disability, it avoided the problem by advocating that a team shall assess and determine whether a learning disability exists. With the best of intentions, these teams are not likely to go beyond developing and applying operational procedures for the identification of learning disabilities.

Apart from these official efforts at defining "learning disability" in an operational form, several attempts have been made by school systems and institutions to develop their own operational definitions. One such attempt made in Rochester, Minnesota (State of Minnesota, 1977) used a Variability Coefficient, which was derived from a discrepancy between verbal and performance IQ and the discrepancies between standard scores in school subjects and performance IQ.

Comparative approaches which use test scores of different types to determine discrepancy make the implicit assumption that the various tests measure clearly defined constructs, and that their contents are essentially different from each other. An examination of the tests commonly used in these situations, however, will reveal that this is not the case. For example, the verbal scale of the Wechsler Intelligence Scale for Children (WISC) contains items in arithmetic, vocabulary, comprehension of language, and production of linguistic expressions. These kinds of tasks are also found in achievement tests such as the Iowa Tests of Basic Skills, the Peabody Individual Achievement Test

(PIAT), the Wide Range Achievement Test (WRAT), and others generally used. The discrepancies between scores therefore leave much to be desired when it is not clear what the tests are measuring, and how different they are from each other.

Another problem associated with procedures based on the discrepancy model is the underlying assumption that intelligence is an independent ability, and that a precise measure of it could be arrived at by the use of any one of several tests. The case for intelligence as an independent variable is conceptually weak, particularly when one examines some current interpretations of intelligence.[1] Hunt (1961) states, in general, that intelligence consists of learned competencies. Resnick's recent compendium on intelligence and cognitive development contains many interpretations of intelligence as cumulative generalized learnings which are based on experience (Resnick, 1976). These sources suggest that intelligence is not independent of learning, but rather that intelligence, as measured by tests, is one form of achievement which enters into school learning. Distinctions among intelligence, aptitude, and achievement tests (Wesman, 1956) may be made on the basis of purpose, but not in terms of content. This line of reasoning severely reduces the strength of the ability-achievement discrepancy model and brings into question the practice of determining learning disability on the basis of a discrepancy between IQ and scores on tests generally classified as achievement tests.

The Need for an Empirical Approach

From a logical point of view, we need to identify essential learning skills so that we may assess whether a person does or does not have

these skills. The concept of disability should be based on what is known to constitute satisfactory levels of competence for a particular kind of behavioral situation, such as school learning. The literature in the field of cognitive learning points to three broad domains of competence as being essential for school learning. Piaget has identified several "logico-mathematical" processes (Flavell, 1963). Within this broad domain he included perceptual processes, conceptual processes such as those which involve classification and ordering, and relational processes which involve making inferences and analogies. His mathematical component included the concept of number, manipulation of number, conservation of number, and a broad range of mathematical processes generally included in the elementary school curriculum. The initial part of the Piagetian definition consisted of what may be described as the inner language of thinking, while the latter part may be described as the symbolic language of mathematics. Piaget recognized the importance of language as contributory to cognitive development, but did not consider it as a primary condition for cognitive development. Other cognitive psychologists, such as Bruner and Vigotsky, however, have emphasized the central role of language in cognitive development.

The three components which are presented and defined in the model for Basic Competencies in Figure 1 can be considered as broadly inclusive of the basic learning competencies that a child would need in order to acquire school learning in general. The domains and areas of competency identified are as follows:

Information Processing

Relating Skills
Organizing Skills
Observing Skills

Language

Reading for Meaning
Decoding
Comprehending Expressions
Producing Expressions
Understanding Words

Mathematical Reasoning

Solving Problems
Understanding Concepts
Knowing Number and Operations

Insert Figure 1 about here

In order to operationalize the assessment procedure advocated here, one would need to go beyond such a conceptualization and definition. One would need to produce definitions in the form of items, and build developmental scales out of the items. Psychometric procedures, based on latent trait theory (which was the subject of an entire issue of the Journal of Educational Measurement, cf. Hambleton & Cook, 1977; Lord, 1977; Marco, 1977; Urry, 1977; Wright, 1977; also see Sympson, 1979), provide the necessary rationale and methodology for developing sequences approximating growth curves or developmental regularities in the defined domains, and for measuring performance along these growth curves.

This approach of measuring performance in defined functional domains is consistent with what has been described as a cross-categorical approach by Lerner (1976). She suggests a "functional system that will focus on teaching and on the learning disorders common to all the

categories. Functional categories could be divided by areas of learning problems rather than by types of excepticnality" (p. 131). While science is generally concerned with the etiology of problems, society is concerned about disabled children because they have educational deficits. Moreover, since the art of diagnosis in terms of etiology is still primitive, the teaching-learning context is perhaps the best place to begin defining functional categories for assessment.

In practice, assessment has usually resulted in placing children in categories such as mentally retarded, emotionally disturbed, and perceptually impaired. Somewhat differentiated programs have been provided for these categories. But the lack of precise data on the developmental status of individuals in various functional areas has made individualized programming nearly impossible. Assessment for the purpose of remedial intervention has been advocated by many, but the lack of adequate assessment procedures which facilitate programming has left this as a desirable ideal. Scores which relate children to groups in various dimensions, or scores in psychological processes which are foreign to classroom practice, are of little use to the teacher. On the other hand, scores based on behavioral criteria which are familiar to teaching-learning situations are more likely to appeal to teachers and remedial specialists for translation into programs of instruction.

The Assessment of Basic Competencies and Survey

The Assessment of Basic Competencies (Somwaru, 1979) was designed to provide diagnostic assessment in qualitative as well as quantitative terms in the 11 scales or subtests which make up the three domains. A task-analytic approach was used to build the articulated sequences

which comprise the scales. After the scope for each subtest was defined, its content was grouped into clusters, and items were written for each cluster. Professionals in each content area reviewed the sequence of the items and evaluated their appropriateness for various grade levels.

In the spring of 1977, 2120 items were administered to 20,088 students selected on a stratified random basis across the United States and Canada. The items were calibrated through the use of computational procedures developed by Wingersky and Lord (1973) for the three-parameter latent trait model, and then scaled and normed by specially designed procedures. From this large pool, items were selected and assembled into 11 scales (see Figure 2) at a density of approximately one unit apart on an equal interval scale. For each subtest, the scale ranges through 100 points, with the items being appropriate for children from preschool (age 3+ years) to Grade 9, with the exception of four scales which start at Kindergarten. The test battery is primarily intended for children with learning problems. If there is enough evidence of wide-ranging problems or difficulties, one can administer the entire battery, using basal and ceiling rules for economy. On the other hand, groups of selected subtests may be given. If there is not enough information for determining how much of the battery should be given, a survey test, which consists of 36 items in each of four areas, may be administered. The areas for the Survey are: Information Processing, Language, Reading, and Mathematics. The items for the Survey were selected from the same calibrated pool that was developed for the full diagnostic battery.

Insert Figure 2 about here

During the winter and spring of 1978, field test data were gathered in order to determine the reliability and validity of both the Survey and the full diagnostic battery. These data are presented in Tables 1 and 2; they suggest satisfactory reliability and validity.

Insert Tables 1 & 2 about here

When a child is given the full diagnostic battery, his or her levels of competence can be determined as points, called estimates of ability, on each of 11 ability scales. For each point in the ability scales, upper and lower confidence limits are reported to enable the user to evaluate the precision of measurement. These ability scales can be used to assess a child's level of development in each learning continuum in terms of the scaled criteria. They could also be used to assess growth from repeated measures. If normative referents are required for interpretation, one can convert the ability estimates for each subtest into a developmental age, a grade equivalent, or a standard score and percentile rank based on age. For some purposes, it may be sufficient to locate a child's level of competence in each developmental sequence, and to note the patterns of correct and incorrect responses. For the more detailed construction of an IEP, one would examine performance in terms of instructional clusters. The response form is available in two alternative formats: a 12-page booklet in which the items are listed in a single sequence of difficulty, and one in which

the items are ordered separately for each cluster of skills. While responses to particular items would be of interest to teachers, it is suggested that diagnosis be carried out at the more generalized level of instructional clusters, which include varying numbers of items generally ranging from 3 to 12.

Since the primary purpose of the battery is to provide information for instructional intervention, the test manual lists instructional clusters, some ways for developing the clusters of skills, and selected exemplary materials which could be used to develop those skills and competencies which have been identified as weak or non-existent. Instructional materials include published programs as well as validated state and federally funded programs which have not been commercially published.

The use of the Assessment of Basic Competencies battery will not resolve all the problems associated with the determination of learning disability. Decisions or choices have to be made as to whether disability should be determined on a qualitative basis, or on a quantitative basis which is essentially normative. Should a child be considered as learning disabled if he or she does not have certain specific skills, or if he or she shows splintered learning in a domain or test area? On the other hand, should a child be considered as learning disabled if he or she performs at a developmental level that is typically below that of his or her age peers? If so, how much below? The Assessment of Basic Competencies will not provide the answers to these questions, but it will provide a solid data base for decision making, and for determining, after the questions posed above have been

answered, whether or not learning disabilities exist.

The Assessment of Basic Competencies does not offer a new definition for learning disabilities. It makes explicit an operational definition that is implicit in the descriptions of learning disability given by many professionals and institutions. This operational definition focuses on observable and measurable dimensions of school learning. The presence of learning problems does not suggest etiology, but rather a manifestation that is common to all of the conventional categories of learning disability. It should be observed that the use of this generic term often clouds diagnosis and treatment, as it embraces several types of disorders which range from those which are neurophysiological in origin to disorders arising from discontinuities in learning. It is the author's belief that the clusters of skills defined in the three domains of the Assessment of Basic Competencies model are learned behaviors, and are therefore teachable. Diagnosis which is based on teachable categories opens the way for fruitful instructional intervention.

Most current assessment procedures provide global scores on various combinations of abilities or traits, and these are usually expressed in comparative scales. More often than not, assessment becomes a "numbers game," with much art and effort being put into the process of relating scores based on different constructs and expressed in different scales. Sometimes, the devoted diagnostician goes beyond the numbers, and attempts to make oblique inferences about school learning behaviors from performances that are only distantly related to the obvious problem areas. It is suggested that the Assessment of

Basic Competencies can considerably enhance the diagnostic-instructional process by enabling diagnosticians to interface defined criterion behaviors of learning disabled students with instructional teacher behaviors. Appropriate educational intervention could thus lead to the removal of several disabilities which have a cognitive origin, and so restore many children to normalcy in school learning.

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Footnote

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[1]While the case for the intelligence - achievement discrepancy is conceptually weak, administrators for Special Education services are faced with the practical requirements of Federal regulations for the identification of students who are learning disabled on the basis of such discrepancy. The ABC battery could be used for assessing whether such a discrepancy exists. The student's average ability estimate for information processing could be considered as a measure of ability which could be compared with the student's ability estimates in each of the tests in Language and Mathematics, or with the average ability estimates in these two groups of tests. In a validity study, students who were previously identified as learning disabled by conventional tests had profiles of scores obtained on the ABC showing evidence of such discrepancies.

TABLE 1

ASSESSMENT OF BASIC COMPETENCIES: CORRELATION STUDIES

SUBTESTS AND GROUPS	Reliability			Validity															Development		
				SRA Ach. Grade 2				SRA Ach. Gr. 6				WRAT: Gr. K-6			TEACHERS' RATINGS: Gr. 6							
	Grade 2	Grade 6	Grades K-6	Composite	Reading	Language	Math.	Composite	Reading	Language	Math.	Reading	Spelling	Arith.	General Ability	Language	Reading	Math Computation	Math Problems	Correl. with Age	Correl. with Grade	Correl. with WISC Age
Observing	.95	.93	.95	.20	.24	.14	.13	.62	.56	.59	.63	.65	.76	.86	.62	.57	.56	.57	.59	.78	.83	.82
Organizing	.96	.96	.95	.43	.41	.46	.39	.61	.52	.61	.56	.67	.80	.87	.63	.60	.61	.57	.59	.82	.87	.83
Relating	.97	.96	.96	.47	.52	.39	.46	.74	.67	.68	.63	.63	.76	.89	.74	.74	.68	.62	.63	.79	.85	.82
INFORMATION PROCESSING	.98	.98	.98	.45	.48	.41	.41	.70	.62	.67	.65	.67	.79	.90	.71	.68	.66	.63	.65	.82	.87	.84
Understanding Words	.85	.95	.93	.32	.31	.39	.30	.54	.42	.52	.42	.64	.75	.82	.52	.54	.52	.47	.48	.81	.87	.79
Comprehending	.95	.96	.95	.15	.26	.33	.09	.59	.40	.62	.50	.63	.75	.82	.60	.62	.60	.56	.57	.79	.84	.78
Producing	.97	.97	.93	.45	.52	.38	.40	.66	.57	.68	.54	.62	.74	.81	.66	.66	.64	.56	.60	.84	.87	.77
Reading	.93	.96	.94	.73	.68	.74	.56	.72	.65	.66	.62	.84	.87	.82	.72	.69	.67	.67	.67	.86	.87	.80
Decoding	.97	.95	.95	.78	.71	.74	.62	.68	.58	.73	.52	.87	.87	.76	.62	.62	.63	.51	.53	.87	.87	.86
LANGUAGE	.95	.96	.98	.65	.65	.60	.52	.71	.58	.71	.58	.77	.86	.88	.69	.70	.68	.61	.63	.90	.93	.85
Number & Op.	.83	.94	.91	.48	.55	.44	.49	.71	.65	.67	.77	.74	.85	.92	.75	.68	.65	.71	.69	.86	.92	.83
Concepts	.93	.92	.93	.61	.55	.52	.52	.83	.71	.71	.80	.69	.78	.90	.78	.73	.74	.77	.78	.81	.87	.75
Problems	.93	.95	.91	.61	.62	.56	.62	.63	.59	.50	.66	.64	.74	.88	.63	.59	.56	.59	.61	.79	.86	.77
MATH. REASONING	.89	.96	.95	.64	.64	.57	.60	.79	.71	.68	.81	.71	.81	.91	.78	.73	.71	.75	.76	.84	.91	.81
N =	60	45	66	51	51	51	51	45	45	45	45	64	64	64	45	45	45	45	45	69	69	69

Note: These correlations are based on preliminary data. The analysis will be redone with final data and presented in the test manual.

TABLE 2

SURVEY OF BASIC COMPETENCIES: CORRELATION AND MEANS

	RELIABILITY			VALIDITY													DISCRIMINATION					
				SRA: ACH: Gr 2				WRAT:Grs.1-6			Teacher's Estimates						Age 5		Age 9		Age 12	
SUBTESTS	Grade K	Grade 4	Grades 1-6	Composite	Reading	Language	Mathematics	Reading	Spelling	Arithmetic	General Ability	Language	Reading	Math. Computation	Math. Problems	Cor. with Age	Cor. with Grade	L.D. Group Mean	Non-L.D. Group Mean	L.D. Group Mean	Non-L.D. Group Mean	L.D. Group Mean	Non-L.D. Group Mean
Information Processing	.62	.72	.70	.60	.47	.52	.50	.49	.36	.48	.75	.76	.75	.76	.76	.82	.72	5.6	10.6	17.3	22.2	21.8	26.6
Language	.61	.74	.78	.59	.50	.52	.59	.50	.29	.29	.81	.80	.81	.81	.82	.80	.73	7.5	8.7	15.3	21.7	21.7	25.7
Reading	.87	.84	.88	.78	.69	.72	.59	.77	.60	.36	.84	.84	.85	.85	.86	.86	.73	5.1	6.3	18.0	26.6	22.8	30.3
Mathematics	.67	.70	.60	.52	.36	.40	.60	.54	.42	.59	.89	.89	.89	.89	.90	.88	.73	6.0	7.4	15.7	21.2	20.1	24.0
N =	40	51	175	118	118	118	118	70	70	70	306	306	306	306	306	786	618	114	114	95	95	47	47

Note: These correlations are based on preliminary data. The analysis will be redone with final data and presented in the test manual.

DEFINITION OF BASIC COMPETENCIES

LANGUAGE SKILLS

READING:
Literal and inferential comprehension-detail, main idea, sequence, cause-effect.

DECODING:
Knowing letters and sounds, discriminating between sounds, pronouncing words.

COMPREHENDING and PRODUCING EXPRESSIONS:
Using nouns, adjectives, adverbs, pronouns.
Using verbs, auxiliary, modal, copula.
Using function words – prepositions, determiners, conjunctions, qualifiers, etc.
Understanding sentence structure.
Transforming sentences.
Knowing usage and idioms.

UNDERSTANDING WORDS:
Words for objects, descriptions, actions, categories, and abstract ideas.

MATH. REASONING SKILLS

SOLVING PROBLEMS:
Solving problems involving various applications in 1, 2, or 3 steps.

UNDERSTANDING CONCEPTS:
Sets and relations.
Number sentences and symbolic expressions.
Units of measurement – English and metric.
Units of money and combinations.
Geometry and graphs.

KNOWING NUMBER AND OPERATIONS:
Number and numeration.
Order
Four operations with whole numbers, common and decimal fractions.
Conservation of number.

INFORMATION PROCESSING SKILLS

RELATING:
Identifying incongruent relations, inferring rules, completing analogies, solving combinations, making transitive inference, solving problems.

ORGANIZING:
Excluding from class, including in class, relating classes, ordering in sequence.

OBSERVING:
Comparing for similarity or difference, seeing and remembering, completing patterns, visualizing figures after rotation, integrating eye-hand activity, finding figure in background, conserving mass, length, weight, volume.

Figure 1

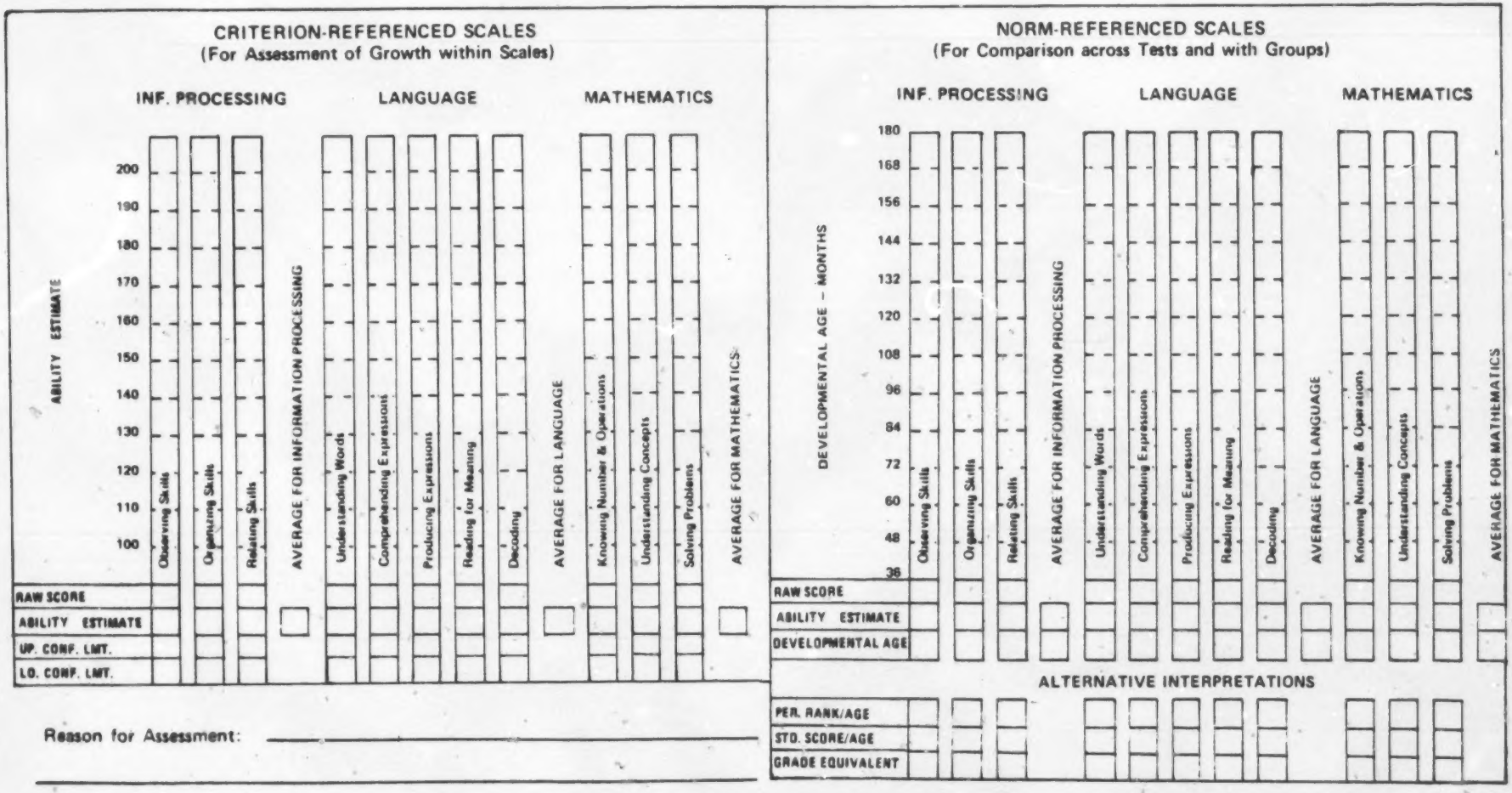
(Abstracted from User's Manual, Assessment of Basic Competencies. Copyright reserved by author)

ASSESSMENT OF BASIC COMPETENCIES — RESPONSE FORM

Name: _____ Date of Testing: Yr. ____ Mth. ____ Day ____

School: _____ Date of Birth: Yr. ____ Mth. ____ Day ____

Teacher: _____ Grade: ____ Age (Nearest Mth.) _____ Sex: ____



Reason for Assessment: _____

Referred by: _____ Assessed by: _____

Figure 2

(Abstracted from User's Manual, Assessment of Basic Competencies. Copyright reserved by author)

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*As part of its continuation proposal, the Institute was required to prepare these monographs. Because they are part of the proposal, they are not available for general distribution.

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